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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,215	12/02/2003	Yasunori Yoshimoto	65933-058	2140
7590 08/09/2006 McDERMOTT, WILL & EMERY 600 13th Street, N.W. Washington, DC 20005-3096			EXAMINER CANTELMO, GREGG	
			ART UNIT 1745	PAPER NUMBER

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/725,215

Applicant(s)

YOSHIMOTO ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 12-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/2/03 & 2/15/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-11 and 30 in the reply filed on July 11, 2006 is acknowledged. Claims 12-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 11, 2006.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

3. The information disclosure statements filed December 2, 2003 and February 15, 2006 have been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the connecting channel is inclined downward from aperture connected to the discharge manifold to the feeding manifold must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

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replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The disclosure is objected to because of the following informalities:
  - a. In the abstract, the phrase "cooling water channels 106 are formed is rectangular" is not grammatically correct;
  - b. On page 25, at line 24, "FIG. 1" should be "FIGS. 1A-1B". This should be adopted for all portions of the specification which recite a figure which is not a sole figure but rather Figs. A and B of a given figure. Due to the significant number of figures present in the application and the length of the specification, applicant is advised to carefully review the specification to identify and make all changes associated with this issue. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-4 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Claim 3 recites the limitation " the bottoms" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim;
- b. The structure of claim 4 is not particularly clear, the last 3 line of the claim in particular. The particular communication and non-communication therein is not readily apparent. It is unclear how the discharge manifold is not communicated with the feeding manifold and with the channels. Is the arrangement therein meant to claim that the discharge manifold communicates with any of the apertures other than the aperture in communication with the feeding manifold and plurality of channels of the claim or is it pertaining to some other structure. Applicant is advised to provide a cleared description of the arrangement therein;
- c. Claim 9 recites the limitation " the discharge manifold " in lines 4-5. There is insufficient antecedent basis for this limitation in the claim. Neither claims 1 nor 8 recite a discharge manifold. Thus the term in claim 9 lacks antecedent basis;. This also applies to claim 11;

d. Claim 10 recites the term "the aperture" however it is unclear which specific aperture this limitation is directed to since there are plural apertures recited in the claim construct (see claim 1). This also applies to claim 11;

e. Claim 11 recites that the connecting channel is inclined downward from the aperture connected to the discharge manifold to the feeding manifold. This arrangement is not made particularly clear by the disclosure of the instant application.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5, 8, 9 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2001-043868 A (JP '868).

JP '868 discloses a fuel cell separator comprising a plurality of apertures 6/6a 7/7a and 8/8a for feeding reactants and coolant in the direction of stacking of the fuel cells, a feeding manifolds 5/5a and 11/11a communicate with respective apertures 6/6a, 7/7a and 8/8a as shown in Figs. 1 and 4-6. A plurality of channels 4 or 10 communicate with the feeding manifolds 5/5a or 11/11a and extend substantially parallel with respect to adjacent channels (Figs. 1 and 4-6 as applied to claim 1).

Feeding channels 5/5a and 11/11a are formed over the whole surface of the end of the channels 4 and 10, respectively (Figs. 1 and 4-6 as applied to claim 2).

The separator is provided in a fuel cell stack which comprises electrodes and an electrolyte sandwiched between the electrodes (as applied to claims 8 and 30).

The depth of the feeding manifolds and plurality of channels are not shown to have a gradient or slope between one another and thus are taught to have the same depth. The electrode adjacent to the open side of the separator can be construed as a cover plate which then covers the upper surface of the feeding manifold. Thus the distance between the bottom of the electrode or covering the open side of the separator and the bottom of the feeding manifold regions is the same as the depth of the channels (Figs. 1-6 as applied to claim 3).

Each separator plate has apertures connected to respective feeding manifolds and channels for flowing fuel, oxidant and coolant along isolated flow paths. Each plate further comprises discharge manifolds wherein for any given discharge manifold, such as a fuel discharge manifold, the discharge manifold in the plate is not in communication with the feeding manifold and channels for the remaining fluid flows, i.e. oxidant and coolant (see Figs. 1 and 4-6 as applied to claim 4).

The feeding and discharge manifolds for different fluids such as fuel and oxidant are on separate sides of the separator and are covered on each side by a fuel electrode on the fuel side and oxidizing electrode on the oxidant side and thus constitute electrodes of different materials for respective electrodes (as applied to claim 5).

The terms vertical, upper and lower as recited in claim 9 are virtual in the absence of a frame of reference which designates these alignments. Structurally the separator of JP '868 has parallel channels which, depending on the orientation of the

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separator or depending on the plane to which these channels are described in relation to, can be vertical. Furthermore if these channels are vertically disposed relative to say the surface of the earth, then the feeding manifold and discharge manifolds would be provided in the upper/lower arrangements of the separator. Again, the structure of JP '868 as shown in Figs. 1 and 4-6 is identical to that of the separator of the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to



consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '868 in view of U.S. Patent No. 6,387,557 (Krasij).

The teachings of claim 1 have been discussed above and are incorporated herein.

The difference between claim 6 and JP '868 is that JP '868 does not expressly disclose of providing a sealer covering the surface of the separator.

Separators are further provided with seal coating to seal the cooling water manifold, the fuel gas manifold, and the oxidant gas manifold from each other (Krasij claim 32 as applied to claim 6).

The motivation for providing a sealing layer between components of the fuel cell is to prevent reactant leakage and/or electrolyte leakage, depending on the nature of the fuel cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '868 by providing a sealing layer between components of the fuel cell since it would have prevented reactant leakage and/or electrolyte leakage, depending on the nature of the fuel cell.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '868 in view of U.S. Patent No. 6,326,095 (Kneidel).

The teachings of claim 1 have been discussed above and are incorporated herein.

The difference between claim 7 and JP '868 is that JP '868 does not expressly disclose of providing a channel-resistance regulating member.

Kneidel discloses providing a channel-resistance regulating member 20 within the feeding manifold of a stack to improve the uniformity of the reactant supply (Fig. 2 and col. 3, ll. 55-57).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '868 by providing a channel-resistance regulating member in the feeding manifold since it would have improved the uniformity of the reactant supply.

10. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '868 in view of U.S. Patent No. 4,124,478 (Tsien), 4,274,939 (Bjaaeklint) or 6,214,486 (Okamoto).

The teachings of claim 1 have been discussed above and are incorporated herein.

The differences between claims 10-11 and JP '868 are that JP '868 does not expressly disclose of the inclined connecting channel of claim 11 or the declined connecting channel of claim 11.

The basis for providing the sloped channel in the feeding manifold is to prevent water from being introduced into the reactant channels in the fuel cell flow field or separator plate.

It is well known in the art to slope, slant, taper or angle the reactant pathways in a fuel cell system for the same purpose of removing moisture from the reactant streams.

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The basis for providing the sloped channel in the discharge manifold is to collect water from the reactant channels and expel the water from the separator.

The concept of slanting or angling surfaces along the reactant flow conduits and manifolds for the purpose of controlling moisture in the flow field and electrodes is known in the art as shown by (Tsien, Fig. 6; Bjaaeklint, Fig. 10A; Okamoto, Fig. 11).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '868 by slanting surfaces along the reactant flow conduits and manifolds since it would have controlled moisture in the flow field and electrodes.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "Gregg Cantelmo", with a stylized flourish at the end.

August 4, 2006

gc

Gregg Cantelmo  
Primary Examiner  
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